REMARKS

Claims 1, 6 and 11 are amended. No new matter is believed to have been added thereby. Claims 1-15 and 23-25 are pending. Applicants respectfully request reconsideration of the rejections of claims 1-15 and 23-25, including independent claim 1.

In the Office Action, the Examiner rejected claims 1, 3, 5, and 6 pursuant to 35 U.S.C. § 102(e) as anticipated by Oshio, et al. (U.S. Patent No. 6,684,098). Claims 4 and 7-13 were rejected pursuant to 35 U.S.C. § 103(a) as unpatentable over Oshio, et al. in view of Sumanaweera, et al. (U.S. Patent No. 5,967,987). Claims 14 and 15 were rejected pursuant to 35 U.S.C. § 103(a) as unpatentable over Oshio, et al. in view of Melton, Jr., et al. (U.S. Patent No. 5,373,848). Claims 2 and 23-25 were rejected pursuant to 35 U.S.C. § 103(a) as unpatentable over Oshio, et al. in view of Hossack, et al. (U.S. Patent No. 6,083,168).

Independent claim 1 recites tracking motion within a region inside a patient, the tracking being with scan data representing the region inside the patient, and automatically altering an acquisition scan plane position relative to a transducer as a function of the motion, the acquisition scan plane position being for acquiring subsequent scan data with a same scanner used for tracking the motion.

Oshio, et al. do not disclose these limitations. Oshio, et al. align a machine coordinate system (MCS) with a personal coordinate system (PCS)(col. 4, lines 42-49). The alignment uses a stereotactic device worn by the user, such as on their head (col. 4, lines 35-41; col. 8, lines 20-28; and Figure 1). The stereotactic device is non-invasive (col. 4, lines 8-13; and col. 7, line 55-col. 8, line 2). For real-time imaging slice correction, a video camera is used to determine the location and orientation of the user-worn, stereotactic device (col. 21, lines 10-19). If the patient's head moves during a magnetic resonance (MR) scan, the MR imaging plane may be aligned to the head (col. 21, lines 20-25). Oshio, et al. use video to detect position (location and orientation) of a worn device and align an MR scan plane to the detected position.

Oshio, et al. do not track motion and alter the acquisition scan plane position as a function of the motion. Oshio, et al. use an absolute position. Due to motion, the absolute position changes. However, it is the position that determines the acquisition scan plane

position, not the change in position. The change in position (motion) is not used to alter the acquisition scan plane position. For example, Oshio, et al. do not use a difference in position or change to alter the acquisition scan plane position. Instead, Oshio, et al. use the current head position to determine the acquisition scan plane position. The "imaging plane can be aligned to the head" to compensate for the motion (col. 21, lines 23-25). If the head is now in a position, the scan plane is located at this position, but the motion of the head is not used to alter the position.

Oshio, et al. do not use a same scanner and scan data from the same scanner to track the motion and scan along the scan plane. Oshio, et al. use video to determine head position and MR or other scanning modality to image the head.

Oshio, et al. do not track motion within a region inside a patient, the tracking being with scan data representing the region inside the patient. Oshio, et al. use video to determine location and orientation. The video camera images LEDs on a head worn stereotactic device. Oshio, et al. image the outside of the patient to determine position, so do not track motion within a region inside a patient where the tracking is with scan data representing the region inside the patient.

Dependent claims 2-15 and 23-25 are allowable for at least the same reasons as independent claim 1. Further limitations patentably distinguish from the cited references.

Claim 3 recites tracking by comparing data from first and second acquisitions. Oshio, et al. align the MR scan plane to a current head position, so do not compare data from different acquisitions.

Claim 5 recites receiving input designation of a region of interest within the region. Oshio, et al. scan through a head and generate an image. However, there is no further input of a region of interest within the region.

Claim 6 recites a multi-dimensional array of elements. Oshio, et al. metion MR predominantly; CT, SPECT, x-ray, PET, EEG, and MEG occasionally; and ultrasound very generally once (col. 4, line 3). There is no disclosure of an array of elements, and no disclosure of a multi-dimensional array of elements.

Claim 9 recites tracking by comparing data responsive to transmitting to at least three sub-regions with data responsive to scanning a representative sample. Sumanaweera, et al.

determine volume flow for different planes, and do not compare data responsive to sub-regions with a representative sample.

Claim 10 recites transmitting grouped sets of beams spaced apart in a volume for tracking a given motion. Sumanaweera, et al. scan the same plane from different directions and with wide and narrow beams. Motion is determined for each scan, not based on grouped sets of spaced apart beams. Sumanaweera, et al. are concerned with the flow and scan accordingly. A person of ordinary skill in the art would not track motion from spaced apart sets of beams since this would not work to determine the flow information desired by Sumanaweera, et al.

Claim 11 recites adaptive alteration of the acquisition scan plane position in response to motion. Sumanaweera, et al. move the transducer to determine motion in a different plane, not to adaptively position in response to motion.

Claim 12 recites shifting two-dimensional images as a function of an initial position of an ROI. Sumanaweera, et al. scan convert to alter from the acquisition polar coordinate format to the display Cartesian coordinate format. This scan conversion does not provide for shifting images as a function of an initial position of an ROI.

Claim 14 recites tracking one of speckle and a spatial gradient. The Office Action relies on Melton, Jr. for this limitation. Melton, Jr. et al. state "this means that the volume is symmetric with respect to the spatial gradient along any axis that passes through its center (not just the x-y-z system shown in the figures)." This is not related to tracking motion using a spatial gradient as required by claim 14. Melton, Jr. merely mentions the term "spatial gradient," and does not teach tracking one of a speckle and spatial gradient.

A person of ordinary skill in the art would not have used the teachings of Melton, Jr. with Oshio, et al. Melton, Jr. et al. are unrelated to Oshio, et al., such as being for different types of imaging over different spatial distributions. Therefore, Melton, Jr et al. should be considered nonanalogous art, and the rejection of claims 14 and 15 should be withdrawn, according to M.P.E.P. §2141.01(a).

Claim 23 requires obtaining data for motion tracking in response to different acquisition parameters than used for imaging. Hossack, et al. determine motion from image data, so do not obtain data for motion tracking in response to different acquisition parameters than used for imaging.

Claim 24 requires automatically altering an acquisition volume position relative to a transducer as a function of the motion. Hossack, et al. operate on two-dimensional images, so do not acquire volumes. Altering the volume position would not improve resolution.

CONCLUSION:

Applicants respectfully submit that all of the pending claims are in condition for allowance and seeks early allowance thereof.

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